Comparing Outcomes After Lumbar Spinal Fusion Using Autograft Versus Allograft Materials

Michael Mancini, BS, Aris Yannopoulos, MD, Michael Cremins, Ph.D., PA-C, Smitha Vellanky, MSc., Grace McCann, BA, Gina Panek, CCRP
The Spine Institute of Connecticut, Hartford, CT
Musculoskeletal Outcomes Institute, Hartford, CT

Introduction

• In the United States, 500,000 spinal fusions are performed with bone graft materials that are used to promote lumbar arthrodesis.
• As we transition to value-based-healthcare (VBHC) and outpatient lumbar fusions increase, cost becomes an ever increasing concern.
• As allograft is significantly costlier than autograft it is important to determine if the graft type affects postoperative outcomes.
• This study aims to define the differences in pain, ambulation, and patient-reported outcome measures (PROMs) between allograft and autograft techniques.

Methods

• We reviewed 590 patients undergoing 1 or 2 level primary lumbar fusions (241 autografts and 349 allografts) performed between 3/1/2015 and 7/31/2018.
• Revisions and procedures that used both allograft and autograft were excluded.
• Examined outcomes:
  o Length-of-stay (LOS)
  o Ambulation metrics
  o Readmission and complication rates
  o PROMs
  o Postoperative pain
  o Narcotic use

Results

• The mean age of patients in both groups was 57 years.
• A significantly greater number of male patients received a fusion using autograft versus allograft (51% v. 42%, p=0.039).
• Body mass index was greater in allograft patients (30.2 v. 28.8, p=0.021), although it is hard to determine the clinical significance between these values.
• There were no differences in time-to-first-ambulation or first-ambulation-distance between groups (Figures 1-3).
• There were no differences in preoperative or postoperative PROMs (measured using the Oswestry Disability Index (ODI) and the EuroQol 5-D (EQ-5D) through one-year of follow-up).
• At 90 days EQ-5D was more improved in the autograft group (p=0.038).
• Pain and narcotic use in the post-anesthesia care unit (PACU) were significantly higher in autograft patients (p=0.002, p=0.001), but no differences were observed during postoperative days 0-4 (Figure 4).
• There were no significant differences in LOS, readmission or complication rates.

Conclusions

• In this study, the ambulation metrics were not clinically impacted by the type of graft used.
• Postoperative pain and narcotic use were only significantly different in the PACU and not the following four days.
• These results are counterintuitive to the popular belief that autograft causes more pain than allograft.
• Given the differential in cost this study is an important first step in advancing VBHC for spine surgery in the age of outpatient surgery.